

**“I prefer to think for myself”:
Upper Secondary School Pupils’ Attitudes towards
Computer-based Spanish Grammar Exercises.**

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Abstract

There is an increasing pressure from school leaders in many countries for teaching to be based solely on ICT tools. The present study is interested in what this does to pupils' attitudes towards ICT in language classrooms. Is a digital monopoly a good way for pupils to learn languages? Is it what they want?

To understand for which tasks students feel that computers are an appropriate tool, a qualitative survey mapping upper secondary school pupils' attitudes towards the ICT use for learning Spanish has been conducted. The study looks at ICT use for grammar practice. A group of pupils have completed lesson diaries, reflecting upon web-based grammar exercises, comparing them to paper-based exercises, and a questionnaire survey on general attitudes towards ICT in language learning.

The results indicate that the majority of participating pupils ask for a greater variety of tasks and see a need also for traditional forms of grammar practice, especially written exercises which give time to reflect upon grammar, syntax and vocabulary. They want ICT use to be an option, not a constraint. Many complain on flaws in the design of web-based grammar exercises. This shows a need for more research into the effects of different designs of web-based tools. It also becomes clearer that decision-makers and teachers must focus more on the pedagogical purpose of learning tasks and that the first question to ask is: "How can I teach this in a way that suits my pupils?" rather than: "How can I add more ICT to my teaching?".

Keywords: ICT; CALL; Foreign language learning; Pupils' attitudes; Grammar learning.

Introduction and background

I am one of many teachers witnessing the Information and Communications Technology (ICT) revolution reaching our schools, as an ambitious 1:1-laptop programme is being implemented in the public upper secondary school where I teach. When private schools started offering free laptops, it was seen as a way to attract pupils from public schools (Lund, 2006, 2007; Odlander, 2007). The current 1:1-implementation is motivated otherwise: we need to prepare today's youth for tomorrow's future, increase entrepreneurial thinking and find new teaching methods to enhance pupils' learning (examples from discussions among local school authorities). Educational challenges like these are seemingly all to be solved by giving computers to the pupils. As is often the case, much thinking and dreaming goes on before the computers arrive, but fewer efforts are done after that to make something out of the technology (cf. Svårdhagen et al., 2011). A worrying tendency, locally but also reported in international reports (e.g. Zucker et al., 2005), is the wish to use ICT to save money on other teaching material.

Many researchers and opinion-makers seem fairly agreed on the need to use ICT in school. Cobo Romani & Moravec (2011) discuss how Drucker's (1959) vision of the "knowledge worker" has realised itself and that pupils need to know how to handle the new technique, an opinion expressed also in Motteram (2011). Cobo Romani and Moravec observe, nevertheless, that this does not necessarily mean that ICT is always the best method. The voices heard on ICT in school are, however, mostly focusing on the need of getting more teachers to use ICT, rather than discussing when, how or why (from a pedagogical point of view) ICT should be used.

Computers are often thought to automatically motivate pupils (Zucker et al., 2005; Ware et al., 2006; Kahraman et al., 2011; Edmunds et al., 2012; AlAmmary, 2012; Tallvid et al., 2009). According to Usta (2011), however, neither traditional nor web-based teaching methods influence on pupils' attitudes towards computers or the Internet; considering this, the methods per se would

not automatically constitute a motivating (or demotivating) factor; what is needed is rather a well-planned and varied teaching adapted to student needs and preferences. There are indications that pupils grow weary of computers as the charm of the novelty wears off (Wiebe et al., 2010; Lim et al., 2006; Warschauer, 1996; Chiu et al., 2013). Few seem to bother, though, to ask pupils what they perceive as instructive methods.

As Svensson (2008) and others (e.g. Enkvist, 2002, 2011; Roszak, 1994) point out, there is sometimes an “almost regularly occurring overconfidence in new media” (Svensson, 2008, p. 145, my translation). This overconfidence may be forcing ICT-based teaching methods prematurely on teachers and students, thus neglecting other ways of teaching and learning, as well as impeding a well thought-out use of ICT tools in classroom practice. Ware et al. (2006) stress that, “Justification for the new uses of technology must be based, not on unmitigated, unrealistic optimism, or on uninformed, a priori rejection, but on empirical data matched to particular uses in specific contexts.” (p. 4). Chapelle (2011) also says that it is difficult to conclude what are the effects of ICT use in language instruction, and Buskqvist et al. (2011) write that it is “problematic that implementations of ICT-based forms or elements of instruction are based neither on scientific evidence nor are followed up by scientific studies” (pp. 68 – 69; my translation). In *New Millennium Learners*, the OECD admits the “intrinsic difficulty when researching the effects of technology on educational performance”, and mentions “inconclusive results” (OECD, 2008, p. 7; cf. Rosén, 2012), a view shared by Chapelle (2011). According to Nutta (1998), ICT-based grammar instruction can be as effective or more so than traditional one, while Lim et al. (2006), on the other hand, have found that CALL does not necessarily give better results than traditional instruction. Kroksmark (2006) suggests that pupils might prefer traditional teaching. Interestingly, Wiebe & Kabata, (2010) have found in several studies that teachers perceive ICT use as more useful than many pupils do, and Svårdhagen et al. (2011) point out that school leaders, in their

turn, put more faith in it than teachers do. It may be time to find out more about what the pupils who use the technology actually think of it.

Aim of the present study

A better understanding of pupils' views on purposeful and instructive ICT use in language learning could help us construct better programs and software, and make us understand what needs to be studied more (Larsson, 1986). To be able to perform research on how ICT use changes learning outcomes, we first need to gain a better understanding of what pupils do with their computers in school, and what their feelings towards these study methods are (cf. Wiebe et al., 2010).

According to Ayres (2010), ICT is particularly useful for practicing spelling, writing and grammar skills, but less motivating in other cases. The present study is particularly interested in situations where ICT can be perceived of as obstructing or disrupting the learning, or simply not functioning well, from the pupils' point of view. This is less studied than ICT as a motivating factor; cf., though, Granath et al. (2008) and Andersson (2010), among others.

The aim of the present study is, thus, to investigate attitudes among Swedish upper secondary school pupils towards ICT use for Spanish grammar learning. In order to clarify these opinions, computer-based learning methods are compared to "paper-based" methods. This can hopefully contribute to a better understanding of learning processes in 1:1 language classrooms and of pupils' views on appropriate ICT use for language learning.

The main research questions are:

- When do pupils see computers as an appropriate tool for learning Spanish grammar?
- When do they not see them as appropriate?
- What didactic and scientific implications can be drawn from these results?

Methods

Data were collected at three occasions during the autumn of 2012, using two lesson diaries and a questionnaire. In both diaries, the pupils evaluated and reflected on the teaching methods and grammar exercises they had worked with. The questionnaire, designed according to guidelines in Dörnyei (2010, chap. 2), focused on general attitudes towards computer-based and paper-based grammar learning. The study shows the pupils' thoughts over a few months, thus reducing the issue of attitudinal changes over time (cf. Dörnyei and Ushioda, 2011).

The diaries and the questionnaire were distributed through a course management system (CMS)¹ used at the school and chosen for practical reasons, being already there, ready to be used and known to the pupils.

For the lesson work preceding the lesson diaries, online exercises were chosen to reflect types of exercises easily accessible on the internet and regularly used at the school of current interest.² The exercises consist of fill-in-the-blanks, matching, verb conjugations exercises and similar activities, which, according to Tomlinson (2011), still make up the major part of self-access online material for language practice. The paper-based exercises were produced by teachers or taken from a Spanish textbook (Vanäs Hedberg et al., 2008), and other commercially available material such as Grönwald (1999a, 1999b). The main difference between the exercises was that the paper-based ones also contained sentences to translate to and from Spanish, which will be further commented on later.

The analysis of the lesson diaries and the questionnaire follows a theme-based qualitative content analysis, inspired by phenomenographic methods such as described by Larsson (1986).

¹ See www.itslearning.com. "Courseware", "virtual learning environment", "learning management system" are other terms for this kind of platform (Svensson, 2008; Cavus et al., 2010).

² Established through personal experience and discussions during language teachers' conferences. The online exercises were mainly from http://cvc.cervantes.es/ensenanza/actividades_ave/aveteca.htm and <http://www.ver-taal.com/>.

Participants

Twenty-six pupils in a group of twenty-seven, age 17, gave their informed consent to be part of the study. The average answer rate was 89%. There were 6 boys and 21 girls, reflecting the uneven distribution of Swedish language students at their level (Lannvik Duregård, 2010). The participants being my own pupils, I have avoided to discuss views on learning methods or in other ways alter their opinions. A variety of teaching methods has been used, involving computers as much as other modalities. It has also been clearly pointed out that the study has no relation to grading or other forms of assessing their language skills.

The group was chosen for its mix of pupils from different study programmes: the Arts Programme (henceforth “Arts”, 5 pupils); the Business Management and Economics Programme (“Economics”, 4 pupils); the Natural Science Programme (“Science”, 15 pupils); and the International TIME Programme³ (1 pupil). The TIME pupil’s answers are analysed with the Science pupils’. It was their sixth year of Spanish studies and their Spanish proficiency corresponded approximately to the B1 level of the CEFR scale (cf. Skolverket, 2013). They had their own laptops, provided by their schools.

A note on terminology

Exercises, grammar explanations, etc. in books and on loose sheets of paper are referred to as “paper-based”, exercises etc. in digital form as “computer-based”. The term “online” is used for explanations and exercises on the Internet. The term “ICT” (information and communication technologies) is used for discussing not only computers but other digital technologies as well (cf. Kern, 2006, p. 185).

³ This is a Natural Science programme specialising in “telecommunication, IT, media and interactive entertainment” (Karlstads kommun, 2012).

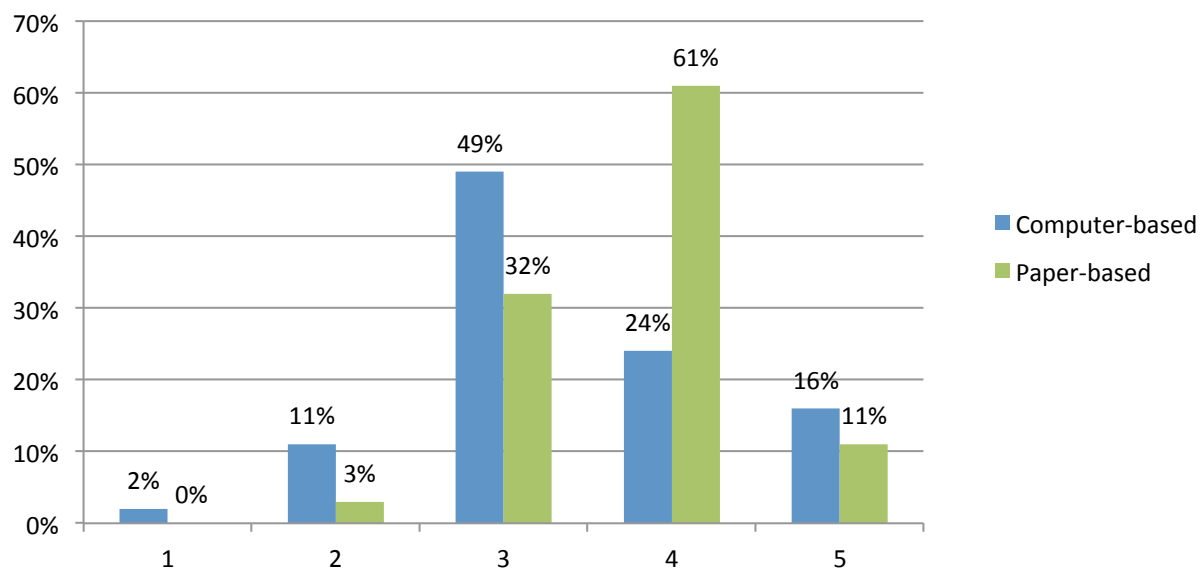
Results and reflections

Results from Lesson diaries

The lesson diaries focused on pupils' perceptions of grammar exercises on the Spanish future tense and gerund constructions.⁴

According to Edmunds et al. (2012), using the "Technology Acceptance Model" developed by Davis (1989), the perceived ease of use and the perceived usefulness influence on the user acceptance of a technology. Bearing this in mind, the pupils were asked to grade the instructive value of the computer-based exercises, on a Likert-scale from 1 to 5. Diagram 1 shows the mean percentage from both diaries.

Diagram 1 – Perceived instructive value of exercises (group level)

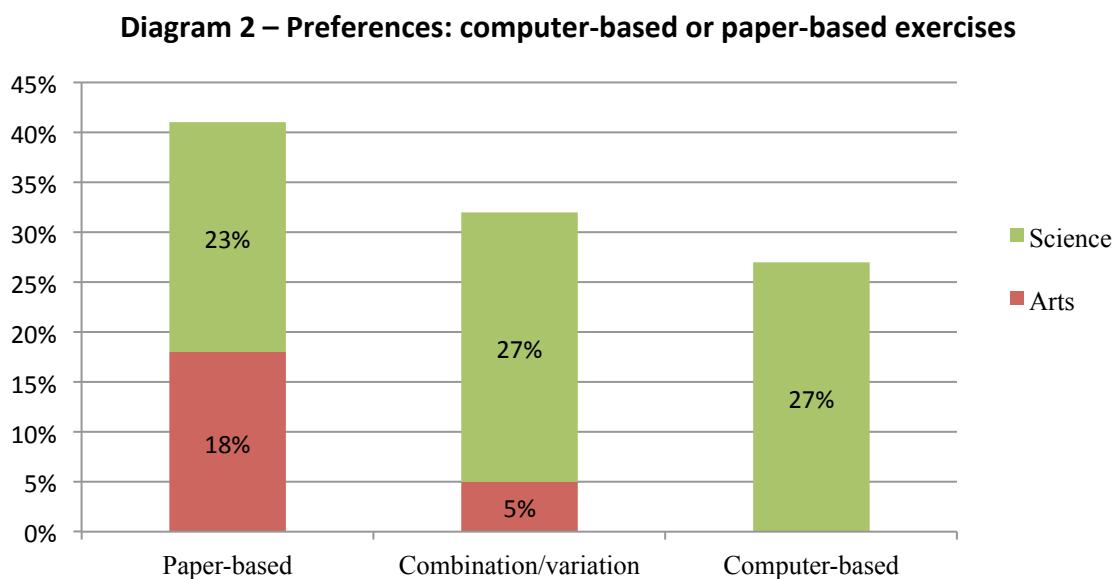


More pupils rated computer-based exercises than paper-based ones "5", but on a whole they preferred the paper-based exercises. Views differed more within the computer-based exercise answers. The Science pupils were more negative to computer-based exercises than the other pupils. It is unlikely that this is due to differing computer skills or experience, as most of the pupils considered their computer skills good (Diagram 3).

⁴ These areas were part of the participants' on-going curriculum.

The computer-based exercises rated higher in the second diary than in the first. The most common rating was still “3”, though, whereas the perceived instructive value of the paper-based exercises continued to rate higher than the computer-based. The increase in popularity for the online exercises can be explained by the fact that they were better structured than the exercises in the first lesson diary. Pupil 8 (Science) commented that the instructions were easy and that her opinion depended “on the quality of the web-sites”.

When asked which kind of exercise they generally prefer, (keeping instructive value in mind but also considering other criteria such as being fun, user friendliness, etc.), the pupils answered as in Diagram 2. (No Economics pupils answered this question.)



There was a slight preference for paper-based exercises. Some of the motivations for this were that the pupils felt that they learned better when they wrote by hand, that it was easier to focus on the task and that they “sort of get the feeling in the hand” (pupil 16, Arts) when writing by hand.⁵ Every Arts pupil but one preferred paper-based exercises, and no one wanted only computer-based exercises. Only 6 out of 22 pupils (27%) preferred to use only the computer, none of them

⁵ Cf. Longcamp et al. (2008) and Velay et al. (2004a, 2004b), for neurocognitive studies where young and adult learners recognised and remembered letters better when they had learned them by handwriting, compared to typing on a computer.

Arts pupils, while the remaining 73% preferred to work with paper-based exercises or with a combination. This wish for combined teaching methods is in line with Motteram's (2011) opinion that web-resources do not cross out the use of text-books but can be a way to enhance them or update their information. These results might also be compared with Wiebe et al. (2010), saying that, "students chose their textbooks to be the most effective for materials in their course" (p. 226) and Hegelheimer et al., (2006) writing that "learners often want to focus on form and wish for a pedagogical tool to serve as a reference and an easy-to-use resource" (p. 259).

In the general comments on computer-based and paper-based exercises, only one pupil thought that the paper-based exercises were "fun"; many appreciated them, however, seeing them as instructive and presenting them with a good opportunity to review old knowledge and learn more. Several pupils mentioned the instructive value of tasks involving translation of entire sentences, (something rarely seen in computer-based exercises), and asked for more of them. In a Swedish school context, this is worth noticing, as the national curriculum for foreign languages does not include translation (Skolverket, 2013; cf. Council of Europe, 2001, chap. 2.1.3).

Several pupils stated that they learned more easily when working with pen and paper. Only three pupils believed that they learned more from online exercises than from paper-based, and some pointed out that a combination of methods is preferable. One pupil (5; Science) said that online exercises facilitate revising grammar at home, but others thought that papers are easier to save for reviewing. The variation of working with both paper-based and computer-based exercises also made it easier for her to work for longer without getting tired or bored. Another pupil (2; Science) commented that being able to choose from many different types of exercises makes it easier to cater for different learning styles. A few pupils preferred the online exercises because they did not have to keep any papers, whereas others wanted papers as they felt that it was easier to gather all the papers in one place and keep them for reviewing or studying for tests later.

Results from the Questionnaire survey

The questionnaire focused on general attitudes towards the use of ICT, compared to paper-based methods. Questions were also asked about general computer competence and confidence, and computer use in and outside of school.

Computer competence and general computer use

As indicated in Diagram 3, a majority of the pupils had high or very high confidence in their computer competence. Most of them were frequent computer users at home and at school (Diagrams 4 and 5). Negative attitudes towards the use of ICT can apparently not be explained with lack of computer competence or experience, in this study.

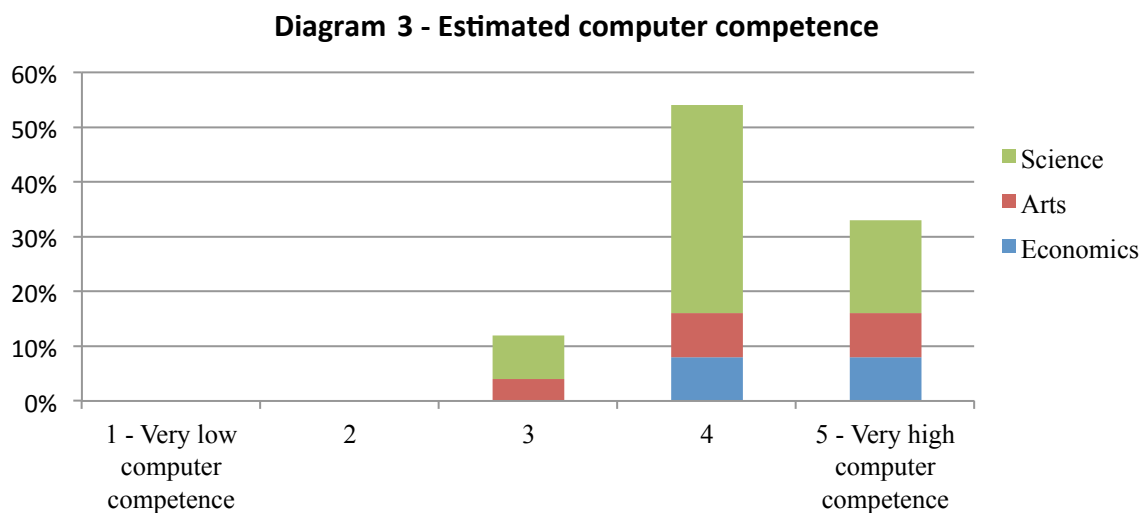


Diagram 4 - Frequency of computer use at home for school purposes

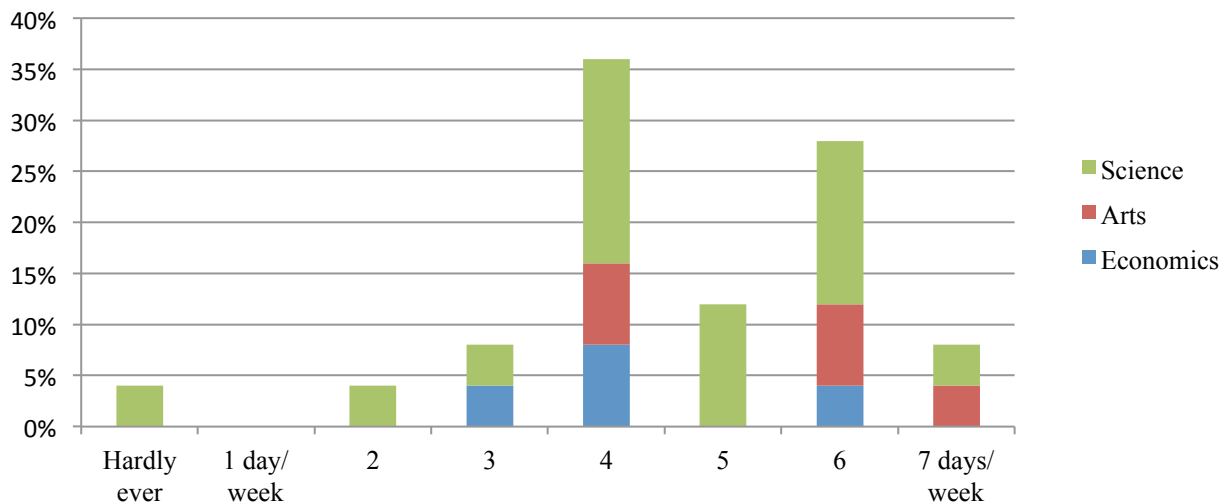
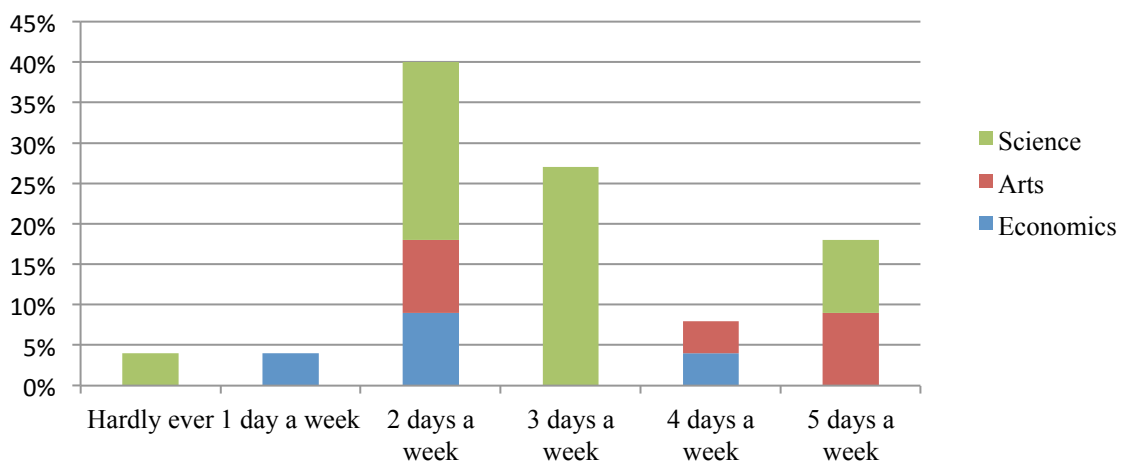
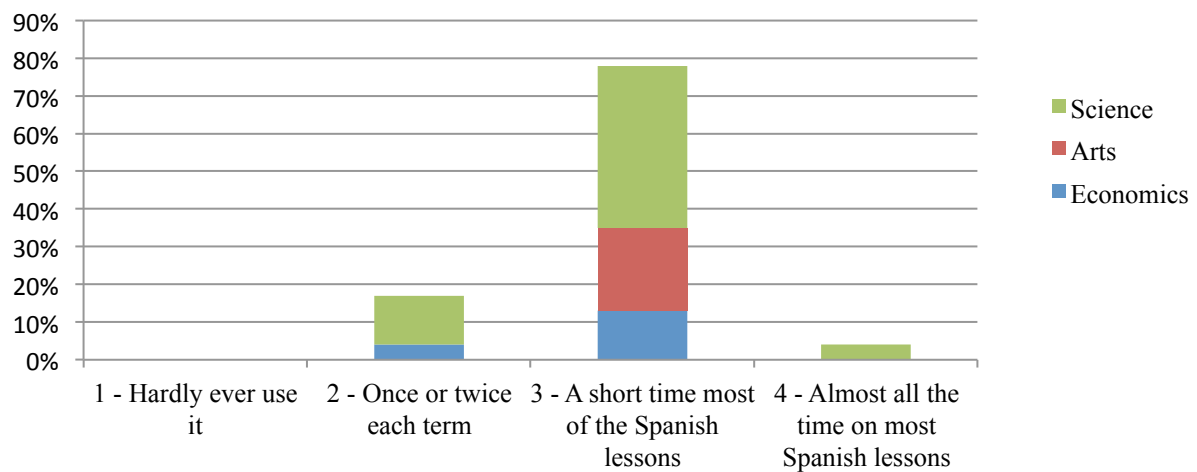


Diagram 5 - Frequency of computer use during lessons (all subjects)

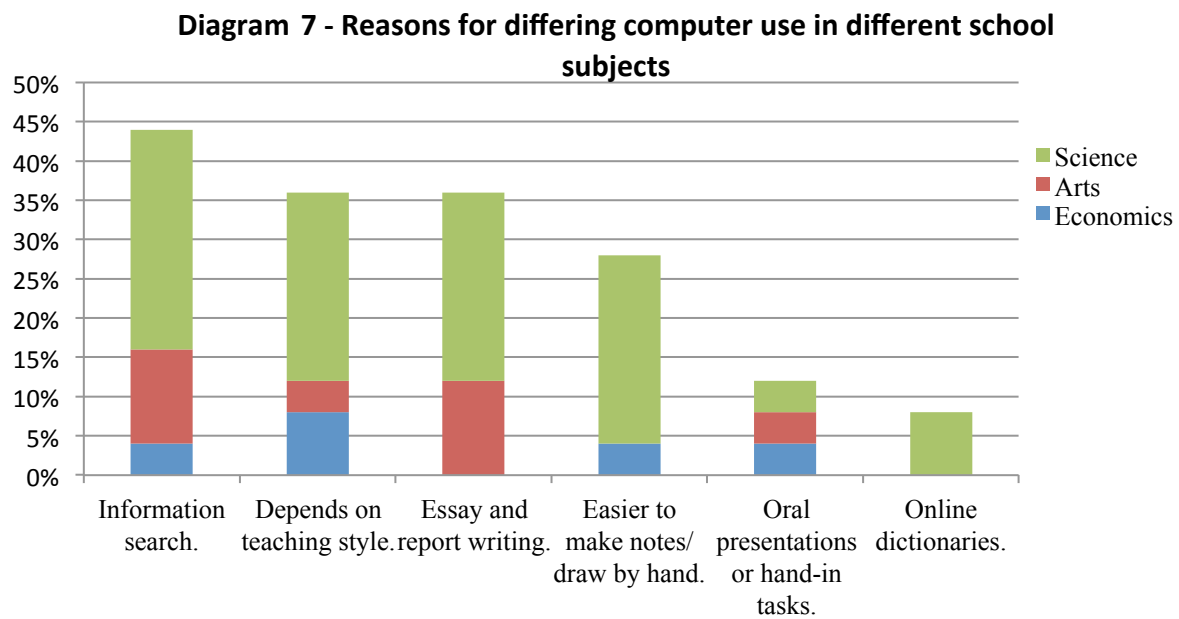


The pupils used computers mostly in language lessons and social sciences. Pupil 21 (Economics) commented that he hardly ever used the computer in any subject, except for oral presentations. He preferred to use his smartphone, as it can perform everything he needs during the lessons and is easier to carry around. He was not alone: most pupils used the computer regularly during Spanish lessons (Diagram 6), but 80% also used smartphones to look up words or other information. More pedagogical uses of the smartphone, such as applications for vocabulary practice or watching instructive videos, were rarely found.

Diagram 6 - Individually chosen computer use during Spanish lessons



Four main reasons to explain differences in computer use between subjects can be distinguished (Diagram 7). Languages and social sciences involve more information search and writing. Several pupils pointed out that it is more difficult in some subjects (mathematics, physics, and chemistry) than in others to make notes on the computer, as they require drawing of diagrams, graphs, etc. The computer use also seems to depend on teachers' preferences and ways of teaching (cf. Svärdhagen et al., 2011; Thullberg et al., 2009). Different schools seemingly have different ICT culture; especially the Economics pupils made little use of their computers. Whether this depends on teacher beliefs, lack of teacher training, or other factors, needs to be further investigated.

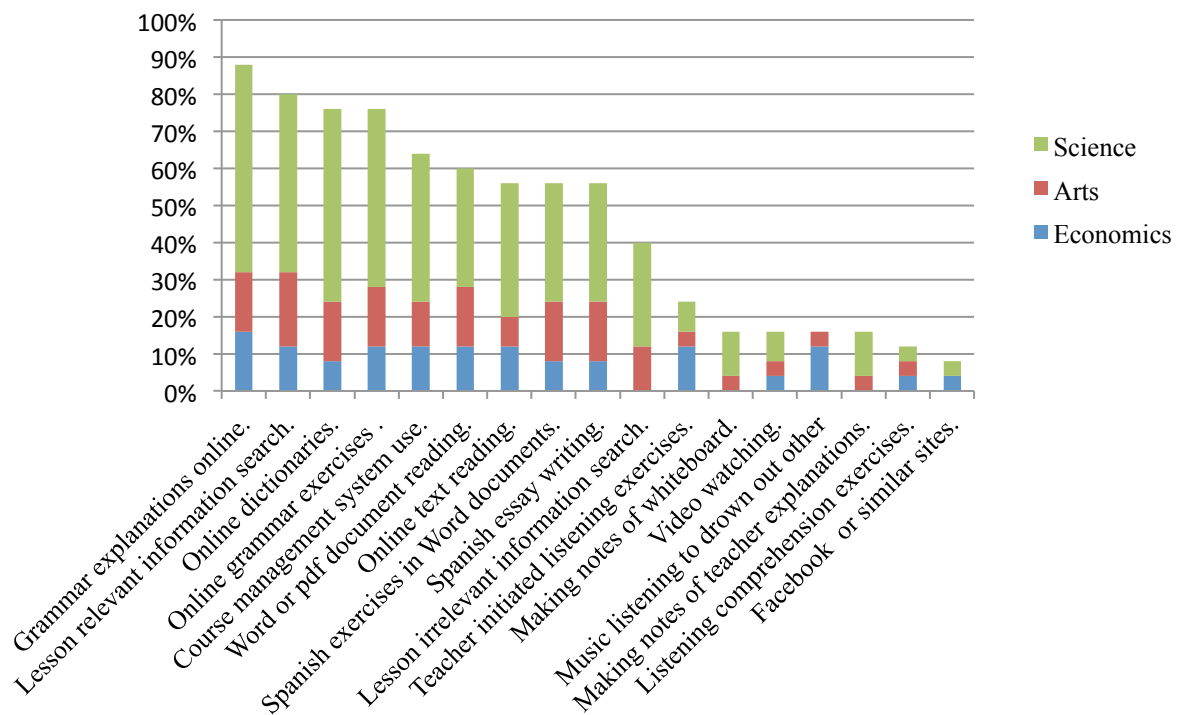


Some pupils did not clearly link their computer use to specific subjects, but rather stated personal reasons for (not) using the computer. Pupil 15 (Science) commented that she starts her computer only if the teacher says that it is going to be used during the lesson; she preferred not to use it as it makes her focus less on the lesson content. Pupil 18 (Science), showing a clear aversion to computers, stated that she chooses to use papers, unless the teacher tells her to use the computer. An Economics pupil (17) wrote that the computer makes storing information from the lessons easier. This can explain why she preferred to use the computer in subjects where the teachers give out digitalised information, but it does not explain why the computer use in those particular subjects is elicited by the teachers.

The pupils reported many uses of their computers during the Spanish lessons (Diagram 8). Facebook interaction, dreaded by many teachers, was scarce, although there was much “lesson irrelevant information search” going on, including looking at the online schedule, finding out what is for lunch, checking bus time tables etc. Again, reading, writing, searching for information and doing exercises were among the main areas of computer use; surprisingly, though, essay writing did not score higher. According to Warschauer et al. (2010), “the greatest impact of individual laptop use is on student writing” (p. 221).

Few pupils used the computer for making notes, and many expressed clearly that they saw great disadvantages in using the computer for this. (Only one pupil stated the opposite.)

Diagram 8 - Areas of computer use by pupils during Spanish lessons



Advantages and disadvantages of computer or pen/paper use

As shown in Diagram 9, the most useful use of the computer, according to the pupils, is for writing essays (although, as seen in Diagram 8, this use could increase among the participants). Almost half of the pupils saw online dictionaries as useful, and about a third mentioned grammar exercises and information search; even fewer online grammar explanations (they preferred explanations by the teacher). Only Economics pupils talked about the use of computers for oral presentations, with PowerPoint. Again, this might depend on different school or study programme cultures.

Diagram 9 - Perceived usefulness of computer use in Spanish lessons

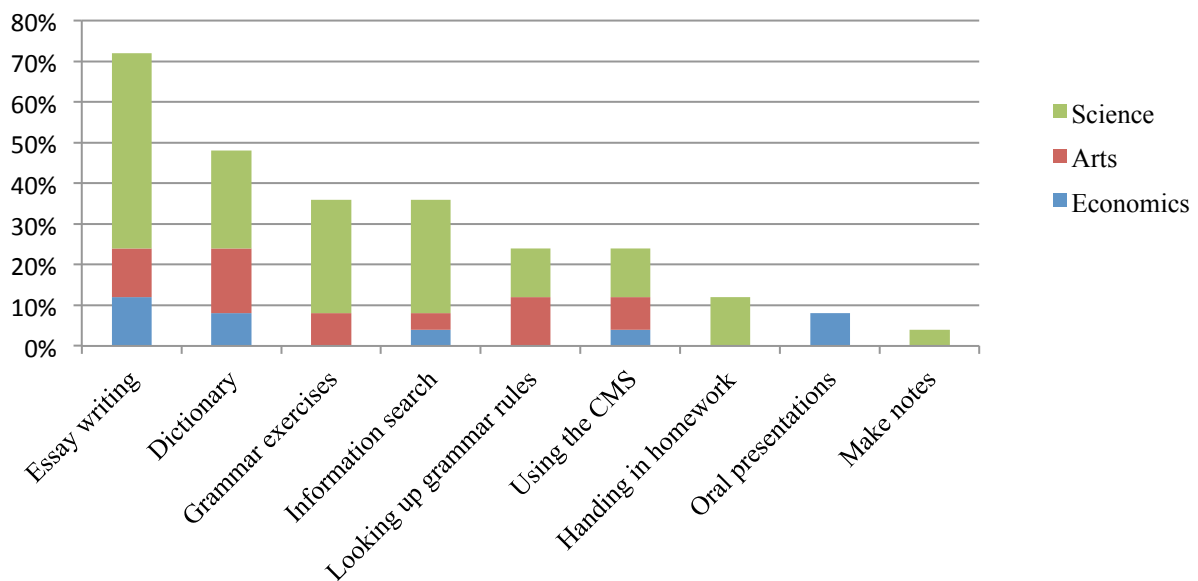
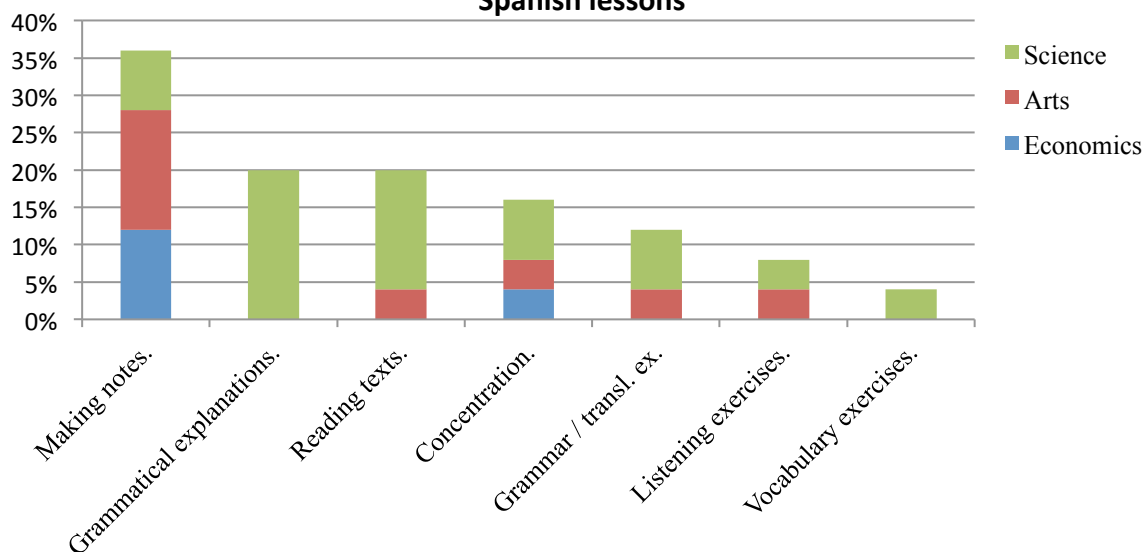


Diagram 10 shows the areas that the pupils did not see as good for computer use.

Diagram 10 - Perceived disadvantages of using computers in Spanish lessons

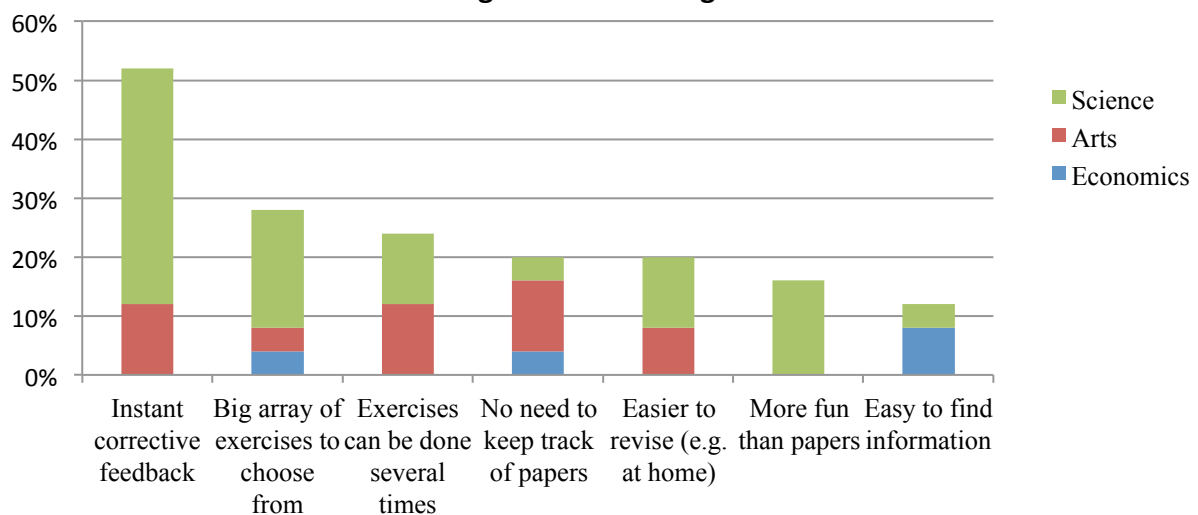


Making notes was repeatedly commented on in the questionnaire. Many pupils found it difficult to make notes on the computer, whereas only one preferred to use the computer. Teachers wishing to increase ICT use in their classes probably need to take this opinion into account and teach suitable techniques for making notes and filing them (be it on computers or by hand). Several pupils also wrote that they did not enjoy reading longer texts on the computer, as it was tiring for the eyes. Working on the computer was also seen as distracting by some pupils.

Grammar explanations are also an area not suitable for computer use, according to some pupils, who preferred teacher-led oral explanations at the whiteboard and/or individual explanations by their desks.

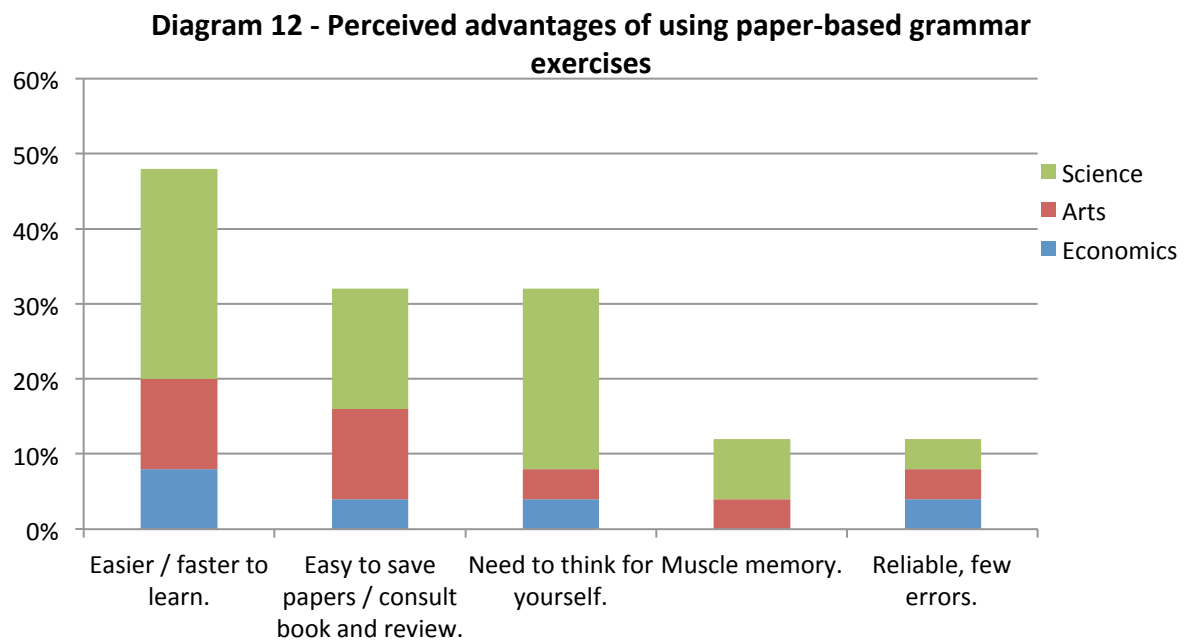
The major advantage of online Spanish grammar exercises (Diagram 11), according to many of the pupils, is the instant corrective feedback. One of the Science pupils also mentioned the spell checker function in Word as an advantage.

Diagram 11 - Perceived usefulness of using computers for Spanish grammar learning



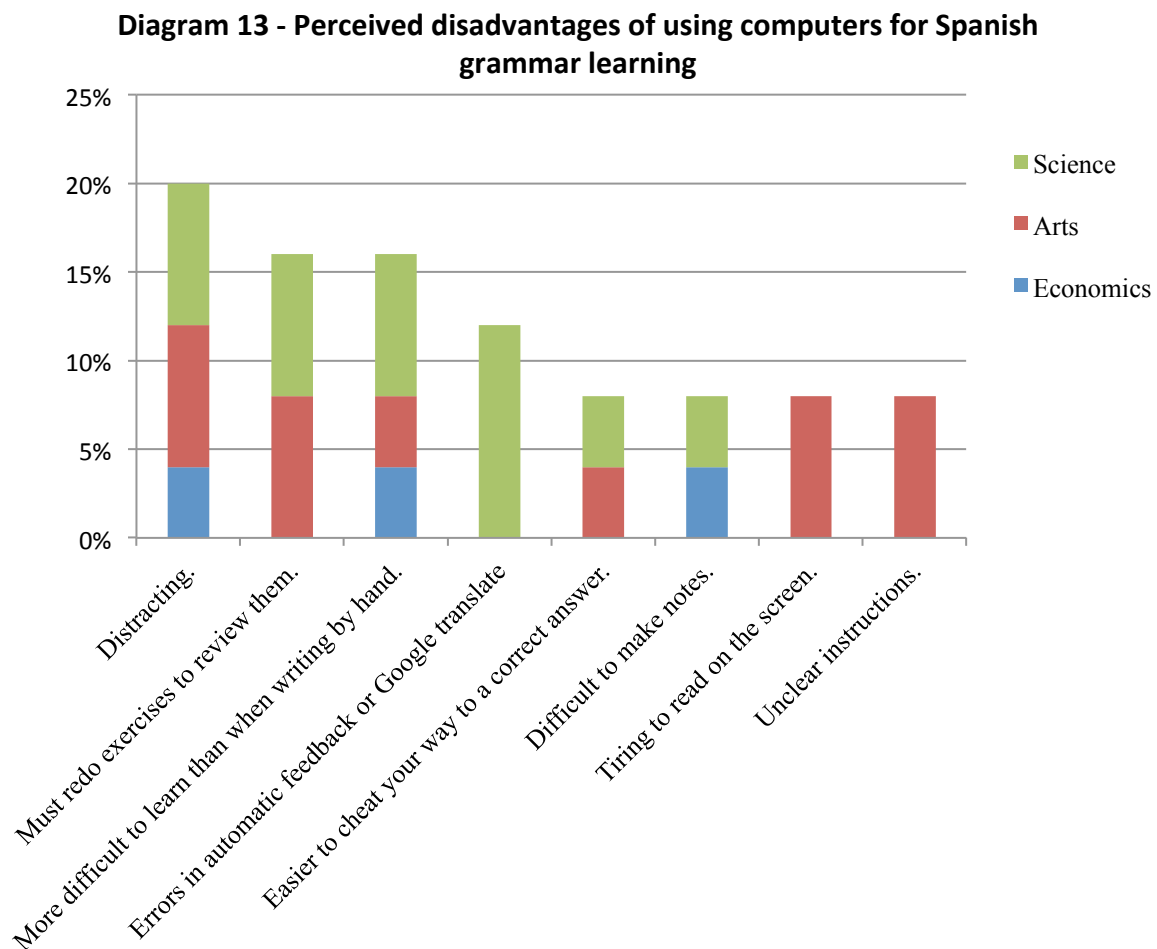
In a study on electronic feedback and development of writing skills in a second language, Ware et al. (2006) conclude, though, that automated grammar feedback has unclear influences on students' writing skills. Pupils' reactions to this type of automated correction may be further researched. Many pupils enjoyed the automatic feedback but were aware of its drawbacks, and commented that without the automatic correction they were forced to think more for themselves, and performed the paper-based exercises with greater care.

Features such as big variety of exercises to choose from and repeatability (without having to use an eraser) were also mentioned as advantages of computer-based exercises, as opposed to typical paper features (Diagrams 12 and 13).



Several pupils conveyed strong opinions on advantages of paper-based exercises. Pupil 9 (Science): “there’s no automatic correction [and] you have to know what you’re doing”. Pupil 18 (Science): “you get a very concrete feeling, and it absolutely [enters] your brain a hundred per cent faster, when things are in paper-form. You can quickly ask the teacher or look things up on the internet if you’ve made a mistake.” Pupil 14 (Science): “I feel that I learn the spelling better if I can write by hand instead of using the computer”. Pupil 17 (Economics) also mentions spelling, and that it is an advantage to have to think for yourself instead of getting the correct spelling from the spell checker in Word. Pupil 16 (Arts) says, “I get a better feeling for the grammar when I write by hand” and “I also think it’s important to keep writing by hand so that we don’t lose it completely just because the computers soon take over”.

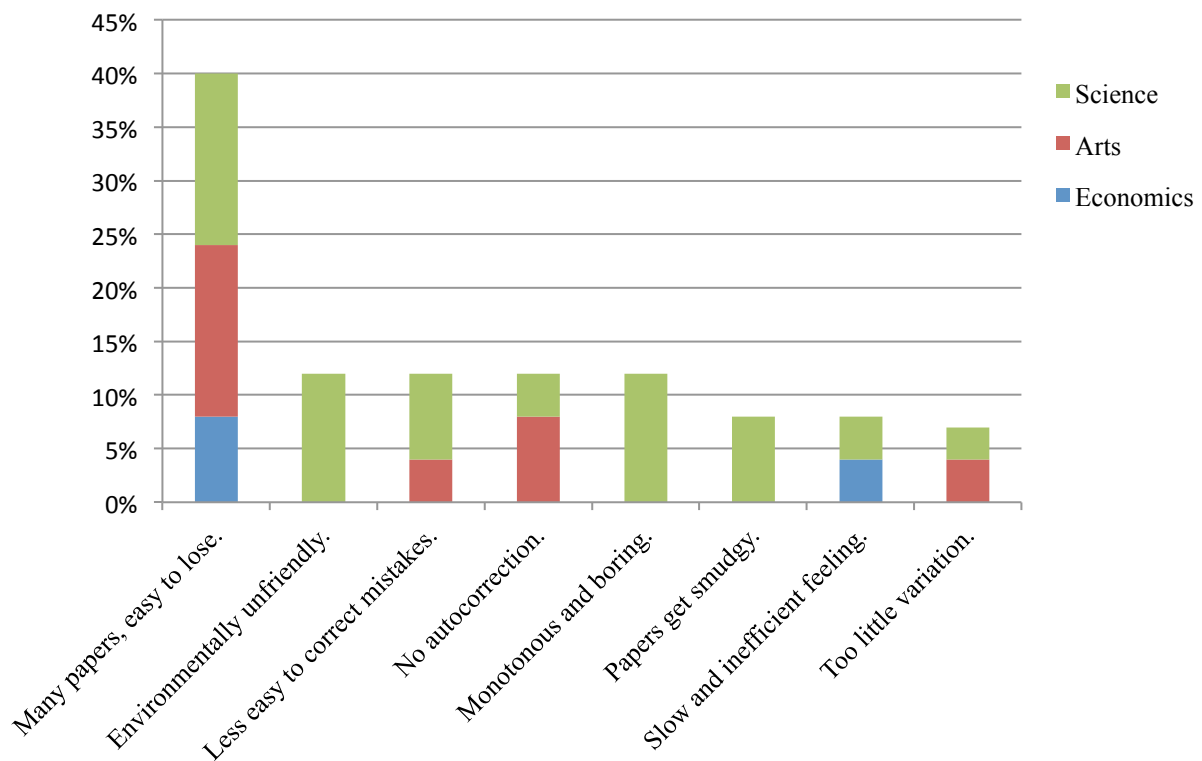
Several pupils liked the auto-correction feature of many online exercises, but here, pupils 23 and 13 (Science) said that it is good for learning to have to do your own corrections or revisions.



Some pupils mentioned the possibility to review online exercises at home as an advantage of computer-based exercises. Nevertheless, when it comes to perceived disadvantages of computer-based exercises (Diagram 13), several pupils pointed out that in order to review the content of many online exercises at a later occasion, they must do them all over again, something not needed with paper-based exercises. They also found computers distracting (either because they were tempted to do other things online, or because the exercises themselves were distracting due to bad structure, irrelevant pictures or other design flaws). Unclear grammar explanations or instructions can also be confusing and take attention away from the instructive purpose of the exercise – pupil 10 (Arts) explained how she sometimes focused more on the exercise layout than on its content. To cite Brett et al. (2011), “Teaching material’s design stands out as one of the important questions for pupils, both in paper format and online”.

Errors in feedback, online dictionaries or translation sites also annoyed the pupils. Pupil 18 (Science), wrote, “Google translate [...], it’s the worst thing I know! Many times it absolutely doesn’t work; many times the sentences are incorrectly constructed. I prefer to think for myself!”. Discussing advantages and drawbacks of using interactive whiteboards and multimedia in language classrooms, Cutrim Schmid (2008) raise similar thoughts among pupils, pointing out that the technology does provide them with easy answers but makes them think less for themselves, thus not evolving their imagination or learning strategies.

Diagram 14 - Perceived drawbacks of using paper-and-pen grammar exercises



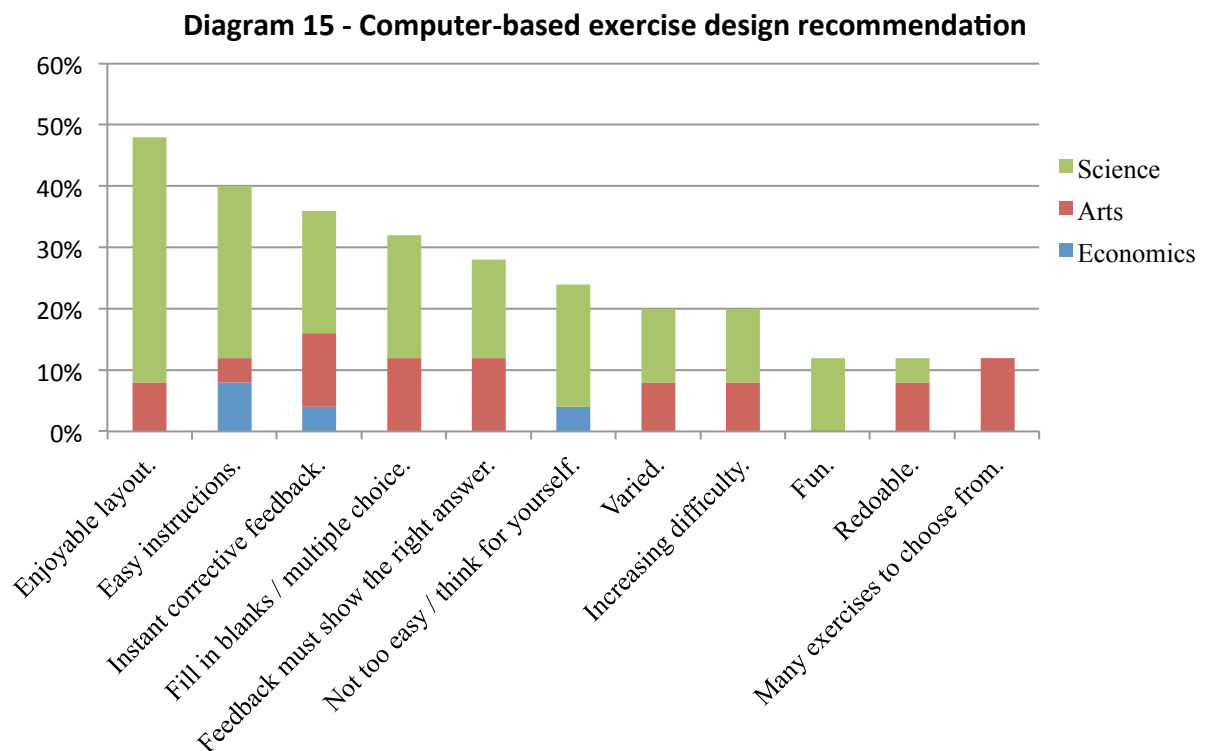
Many pupils saw the fact that papers are easy to lose or forget as the main drawback of paper-based exercises (Diagram 14). Pupil 10 (Arts) pointed out, however, that it is up to the pupil not to lose papers and that he/she can purchase a loose-leaf binder.

Pupil 20 (Science) found it boring to correct the exercises manually, saying that this leads to not doing any corrections and thus not learning as much. Pupil 11 (Arts) had similar thoughts and

mentioned that manual corrections are time consuming. Pupil 23 (Science) also thought that paper-based exercises are boring, since “most of the things you do at school are done in paper-form”, and she said that this made her less focused. Pupil 12 (Arts) said that paper-based exercises generally are less individualised.

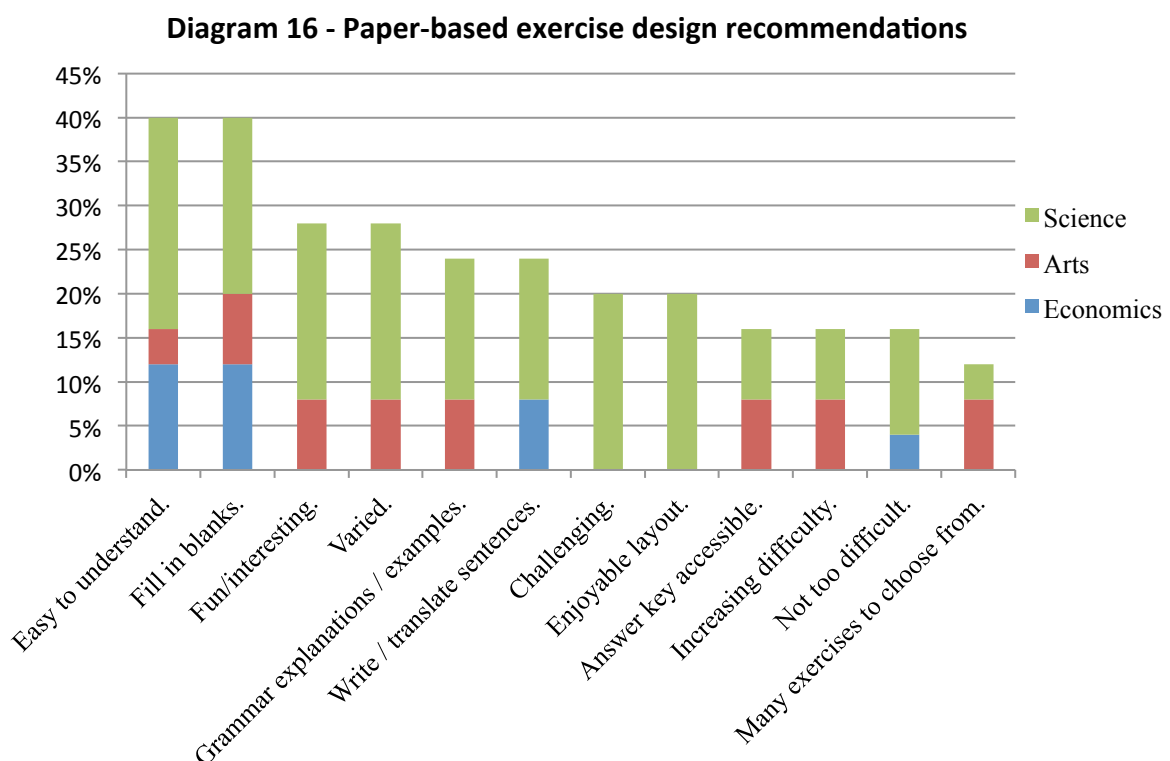
Recommendations for the use of computers or paper and pen

The pupils’ most frequent recommendations for computer-based grammar exercises design (Diagram 15) focus on layout, instructions and feedback. The design of exercises influenced greatly on several pupils’ opinions on whether they were useful (cf. Brett et al., 2011). The researcher could arguably have found better exercises; however, as mentioned before, efforts were made not only to find exercises with a clear layout and a well thought-out instructional purpose, but also to choose material reflecting what is actually used and easily accessible for teachers.



Again, many pupils appreciated the instant corrective feedback. However, automated correction might be most appropriate as a complement to traditional corrections, as the interactive parts of ordinary feedback from a teacher ought not be underestimated (Ware et al., 2006). Several pupils stressed that the automatic correction is only useful if the feedback is correct (which was not always the case), and if it is not too “picky”, i.e. that variations or synonyms should be allowed.⁶

The most frequent recommendations for design of paper-based grammar exercises are shown in Diagram 16.



The diagram sums up some of the main points of the questionnaire and the diaries: pupils prefer varied learning material, with well-structured and easily understood exercises that force them to use their mental capacities, providing them with good explanations of the grammar to learn. They like “fill-in-the-blanks”, although not few pupils expressed the feeling that they learn more, better or faster when writing by hand (making notes, doing exercises, translating, writing essays) as this

⁶ A good example is an exercise asking pupils to conjugate verbs in the “you”-form. Spanish has five verb endings translatable as “you”. Erroneous corrections were not uncommon.

makes them think more. The pupils also asked for more written exercises, computerised or by hand, such as translations and essay writing.

Conclusions and discussion

The main research questions in the present study were:

- When do pupils see computers as an appropriate tool for learning Spanish grammar?
- When do they not see them as appropriate?
- What didactic and scientific implications can be drawn from these results?

To the pupils, some things seem more important than others in computer-based grammar exercises: the corrective feedback (preferably instant, but not too picky; it must on the other hand make no mistakes); the interface design (not confusing or distracting, and providing clear instructions). Many of the participants, thus, enjoyed online grammar exercises, if they are well structured, instructive and provide accurate automatic corrective feedback with explanations to the errors. If these wishes for online exercises design are to be met, teachers (and/or pupils) need to be able to modify the exercises, as much of the available material is poorly constructed (Pegrum, 2009; Kervin et al., 2011; Motteram, 2011). The question is whether teachers are – or feel – competent to do so, and if they can find the time for it. If Tomlinson (2011) is correct that these kinds of auto-corrected exercises function best for pupils who learn easily on their own, but less for others who need more teacher explanations, schools need to be aware and not put too much faith in them.

Rosen (2010) writes that pupils “thrive on multimedia, multitasking, social environments for every aspect of their lives *except* education” and that “we must find new tools to engage our students and help them learn in ways that work for them and for teachers” (pp. 3 – 5). The present study contradicts this somewhat, as the participants appreciated traditional learning and teaching

styles when they were challenging and well thought-through. One might ask, as Roszak (1994), if “the curriculum [is] to adapt to the computer, or the computer to the curriculum?” (p. 52).

The participating pupils saw computers as useful for writing essays, searching for information and using online dictionaries. These might be the areas of language instruction most suitable for ICT-based learning. As for online dictionaries, it is important that pupils learn how to use them (as well as printed dictionaries), and which ones are reliable. School authorities should invest in good digital dictionaries – probably also for mobile phones – rather than suggest that teachers and pupils rely on non-cost online alternatives. The results of Chiu et al. (2013), finding that the retention of new words is better when pupils have used printed dictionaries, compared to electronic versions of the same dictionaries, ought probably to be taken into account as well.

Most of the pupils saw computers as less useful for making notes. Teachers may teach them better ways to make notes and to file information, if it is desirable that computers be used more. Considering, however, that not few pupils stated clearly that they learn more easily and retain the knowledge better when writing by hand, schools should ask themselves whether computer use is more important than pupils’ learning. An open dialogue in the language classroom on learning methods and their advantages or disadvantages may be recommended.

Further research suggestions

The present study does not claim to provide any absolute answers to how or when to use ICT-based teaching methods in the language classroom, but indicates, nevertheless, several paths to follow in future research and for teachers to consider in their daily teaching practice. The field of teaching material design would benefit from further studies, especially comparing the effects of different designs on pupils’ attitudes and reactions and the way the design influence on pupils’

interactions with the exercises and their experienced learning outcome.⁷ Multimodal studies could further elucidate how pupils interact with different learning methods in the language classroom, and for what purposes.

Further studies on how pupils use and perceive automated corrective feedback would be interesting, especially in the context of vocabulary and grammar practice, where few studies have been conducted. Compared outcomes of vocabulary and grammar learning using online exercises and exercises written by hand would be of great interest.

Another perspective benefiting from further studies might be the opposite of the one adopted here: teacher incentives to use ICT in the language classroom. Which ICT practices do teachers choose (or not choose), and why? Mechanisms directing teachers' choice of teaching methods are highly interesting in an era where ICT is often seen as the big promising solution to declining pupil performances. Are choices consciously made or do schools succumb to prevailing ideas and computer company lobbyists?

⁷ It is very difficult to evaluate actual learning outcome of a given modality or technique, considering the many other factors involved in any learning situation. Experienced learning outcome may on the other hand have much to say about the appropriateness of different teaching methods.

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